

April 1984

# TWIN CITIES ATARI INTEREST GROUP

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## Forth Notes - #2

By Bob Floyd

In this article, I'll cover the FORTH concept of "words" and the most common words, +, -, \*, and three forms of /. I'll also cover more on Reverse Polish Notation (RPN) and the stack and leave you with a sample word and a partial explanation of how it works.

A standard FORTH package is comprised of a set of words which make up a "dictionary". ValFORTH contains the standard fig-FORTH dictionary (fig stands for Forth Interest Group) plus many extra words created especially for ATARI computers. Hence it is, quoting Valpar, an "extended fig-Forth."

A word in FORTH is simply a subroutine. The word may be comprised of machine code or a series of other previously defined FORTH words. Many of the standard

dictionary words are in machine code. Even though this is not exactly correct, I like to think of FORTH as a series of machine language subroutines available for my use. Thus, the standard dictionary words can be used as building blocks in creation of other words by the home computer user. In this way, you can "tailor" the language to your own use. Debugging of new words is best accomplished one word at a time, and is not too difficult to do in this manner. However, you should be careful not to let your words get too long.

The most common and basic of FORTH words are the arithmetic operands +, -, \*, /, MOD and /MOD. These are all in machine code. Here are examples of their use:

YOU TYPE	STACK
7 3 + <CR>	( 10 )
7 3 - <CR>	( 4 )
7 3 * <CR>	( 21 )
7 3 / <CR>	( 2 )
7 3 MOD <CR>	( 1 )
7 3 /MOD <CR>	( 1 2 )

In the examples, 3 can be thought of as the top of stack (TOS) and 7 as the second number on the stack. So, for subtraction, the number at TOS is subtracted from the second number on the stack. Or, for division, the number at TOS is divided into the second number on the stack. The result of the operation is then stored at TOS. Note that for division, / leaves the quotient at TOS, whereas MOD (i.e., modulo) leaves the remainder, and /MOD leaves both the remainder and the quotient with the quotient at TOS. It is surprising to me how many times I have used MOD and /MOD.

Obviously, these operations are

much simpler than using machine code. All that one must do is think in reverse (i.e., RPN) which, with practice, becomes easier than you might suspect. You must get the numbers onto the stack before you can operate on them. My most common errors are not having a number on the stack that a word is expecting to use, and "flooding the stack" with a looping operation that mistakenly leaves an extra number on the stack upon each loop. This is when it pays to debug short words one at a time.

Here is a simple word that returns the square of a number:

```
: SQUARE      ( n1 -- n2 )
  DUP * ;
```

Note that DUP duplicates the number at TOS and puts the copy at TOS (i.e., the same number occupies TOS and the second position on the stack.) Then \* multiplies them together. For example, when " 8 SQUARE " is typed or is placed in a new word, then 64 is returned and placed at TOS. The : and ; are used in defining the word - more on them later.

Here is another word, named PADL, that I have used in a Pong-type game:

```
: PADL      ( pdl# -- vpos )
  PADDLE DUP 36 <
    IF DROP 36
    ELSE DUP 194 >
      IF DROP 194
    ENDIF
  ENDIF ;
```

It reads the desired game paddle and limits the range of values to be from 36 to 194. The paddle number to be read is already expected to be at TOS before the word is executed. "PADDLE" actually reads the paddle value and is included in one of the ValFORTH packages. DROP removes the value

at TOS. The rest of "PADL" limits the range of values and returns a value to be used for PONG paddle height at TOS upon completion. I'll leave the explanation of >, <, IF, ELSE and ENDIF as food for thought for my next column.

(editor's note: Articles tagged (sorry) with a \* in the title were received after the deadline. Only my great kindness allowed me to enter these in the newsletter.)

#### \* RANDOM RETURNS

Our apologies for the neutral answer concerning the capabilities of the BASIC XL program over all other versions of BASIC. Since we, the two authors, are not yet financially secure we are not able to purchase and test all programs available. We would like to say that our recent conversations with ATARI users confirm the opinion expressed in the review of BASIC XL in the last newsletter: currently BASIC XL is the best BASIC available. One final note is that there seems to be an interest in conducting a complete benchmark test for various hardware and software products. This would cover all models of ATARI computers, the fast chip as well as the versions of BASIC available. We have not found a complete list of these results to date but we do have access to several benchmark programs. If you have a list of verified benchmark runs or are interested in helping with the compilation of test results contact Bernard King-Smith (H) 922-0698.

Well, not too many questions in this month's Random Access Memos. There is an article elsewhere in this newsletter concerning the way to use more than four colors in a display. However, for those of you who have or plan to build the sure-

load device please take note.

#### \*\*\*HARDWARE WARNING\*\*\*

FOR THOSE OF YOU WHO INSTALLED THE SURELOAD CIRCUITRY INTO YOUR COMPUTER AS DESCRIBED IN THE FEBRUARY NEWSLETTER: DO NOT UNDER ANY CIRCUMSTANCES FLIP THE RAM/ROM SWITCH TO THE ROM POSITION WITH A CARTRIDGE INSTALLED. DOING THIS WILL BURN OUT THE INTEGRATED CIRCUIT SOLDERED INTO THE MACHINE.

(another editorial comment-- I have installed the sureload circuitry and have not experienced this problem...but I don't suggest trying it to find out.)

#### DISKS OF THE MONTHS PAST

##### DISK #1

FILE NAME	DESCRIPTION
SCRNDUMP.OBJ	GR. 8 SCREEN DUMPER TO EPSON GRAFTRAX
READDATA.WRT	READS OBJECT FILES & CREATES DATA STATEMENTS
MENUHELP	A MENU CREATOR
MATHTUT	SIMPLE MATH QUIZZER
LUNAR	LAND THE LUNAR BUGGY
FLAGS	GUESS THE COUNTRIES FROM THEIR FLAGS
DUPVIS	MODIFIED DUPANY FOR VISICALC
DUPANY.OBJ	SIMPLE DISK SECTOR COPIER

##### DISK 2

SURROUND	AVOID HITTING WALLS AND TRAILS
SIMON	ONE OF THOSE PESKY SIMON GAMES
ROBOT	AVOID THE ROBOTS
OTHELLO	OTHELLO, WHAT ELSE
LLIST	TAKES LISTED FILES AND PRINTS ON PRINTER
DUNGEON	ADVENTURE-CAN YOU GET OUT?
CASTDISK.OBJ	SIMPLE SINGLE BOOT CASSETTE TO DISK

BUG COPIER  
HELP THE LADYBUG GET  
AWAY (2 PLAYERS)

DISK 3

WUMPUS CLASSIC HUNT THE  
WUMPUS GAME

VIDTEX28.00 COMPUSERVE'S MODEM  
PROGRAM FOR ATARIS

UPDNTAPE A MODEM PORGRAM FOR  
CASSETTES

ULTRAPM A FAST PLAYER MISSILE  
DEMONSTRATION

TAPEBACK A SINGLE BOOT TAPE TO  
DISK COPIER

SOUNDTST TEST ALL 4 VOICES  
WITH JOYSTICK

MORSECDR PRACTICE YOUR MORSE  
CODE

MODEM A MODEM PROGRAM

MATHPRNT PRINTS MATH PROBLEMS  
ON PRINTER

BISASM A DISASSEMBLER

ADVENTUR FIND YOUR WAY OUT OF  
THE FOREST

DISK 4

VEGAS VERY CHEAP SLOT  
MACHINE

VARIABLE.LST LIST ALL VARIABLES  
USED IN YOUR PROGRAM

ROBOTWAR AVOID THE ROBOTS  
AGAIN

NIGHTMARE NOW WHAT WILL HAPPEN?

MISSILE GOOD BASIC MISSILE  
COMMAND GAME

METRICS METRIC CONVERTER

LANDER ANOTHER LUNAR LANDER  
GAME

FUGUE2 PLAYS NICE MUSIC

DAYOWEEK TELLS YOU THE DAY OF  
THE WEEK FOR A GIVEN  
DATE

BOTCH A HANGMAN GAME

BIOCHART A BIORYTHM PROGRAM

AUTORUN.CAS AUTORUNS CSAVED  
FILES

AUTORUN.BLD CREATES BASIC PROGRAM  
RUNNING AUTORUN.SYS

DISK 5

TTT TIC TAC TOE



## NEW FREE PRICE LIST

Pick one up at the next TAIG meeting  
or call to have one mailed out.

Over 800 programs  
from A to Z for your Atari!  
Here are a few samples from that list

ENCOUNTER -D- \$25.97	OIL'S WELL -R- 22.97	HOME ACCOUNTANT-D- 52.97
MAC/65 -D- 55.97	BASIC XL -R- 69.97	SYN-CALC -D- 71.97
WINGMAN -D- 25.97	ACTION -R- 69.97	JUMPMAN -D- \$28.97
PHARAOHS CURSE -D- 25.97	STAR L.BASEBALL-D- \$24.97	LODE RUNNER -D- 25.97
RALLEY SPEEDWAY R- 34.95	ATARI TOUCH TABLET 69.97	JOUST -R- 38.97
PLANETFALL -D- 34.97	INDUST DRIVES 349.00	MS. PACMAN -R- 38.97
SORCERER -D- 34.97	ATARI 1027 PRINTER 289.00	ROBOTRON 2084 -R- 35.97
DEATH STAR -D- 34.97	ATARI 800XL 297.00	POPEYE -R- 34.97
DUNZHIN -D- 22.97	KRAFT JOYSTICKS 8.97	PENG0 -R- 35.97
YOUR ATARI COMP.B- 15.97	WICO 3WAY JOYSTICK 24.00	SCRAPER CAPER -R- 34.97
DONKEY KONG -R- 37.97	ELEPHANT DISK 10/DD 21.70	ZORK I-II-III -D- 28.97
DONKEY KONG JR.-R- 39.97	VERBATIM DISK 10/DD 28.97	DIMENSION X -D- 25.97
ATARI LOGO -R- 76.97	CF DISKS 10/SS/SD 15.97	ENCOUNTER -D- 25.97

## INVENTORY REDUCTION SALE

PRICES ALL BELOW DEALER COST

Quantities are limited and most unsold programs will be returned to distributors  
May 1st. Don't miss your chance to pickup a classic at a steal.

NECROMANCER -D- \$17.97	WIZARDS OF WOR -R- 9.97	DATABASE DIALER -D- 9.97
ZEPPLIN -D- 17.97	REAR GUARD -D- 9.97	DEMON ATTACK -R- 9.97
RAINBOW WALKER -D- 17.97	STELLAR SHUTTLE D- 12.97	WINGMAN -D- 19.97
DRELBS -D- 17.97	WAYOUT -D- 19.97	CHOPLIFTER -D- 19.97
TUMBLE BUGS -D- 7.97	REPTON -D- 19.97	SUNCOM STAR JOYSTICK 5.97
TEMPLE APSHAI -D- 22.97	BANDITS -D- 19.97	TAC*2 JOYSTICK 7.97
UPPER REACHES AP. 12.97	MINER 2049ER -R- 19.97	SLIK STICK \$4.97
GATEWAY APSHAI -R- 22.97	PATHFINDER -D- \$12.97	GAME SWITCH 1.97
STAR WARRIOR -D- 22.97	LOAD-N-GO -D- 7.97	LEFTY JOYSTICK ADAP. 1.97
TT#11 MEMORY MAP D- 9.97	BASIC-XA -D- 19.97	6 FT. JOYSTICK CABLE 2.97
PACIFIC COAST HWY D 14.97	BOB'S BUSINESS -D- 7.97	16K ATARI MEM. BOARD 9.97
PICNIC PARANOIA R- 24.97	M.WORD PROCESSOR-D- 9.97	RAMA 1000 D. DRIVE 297.97

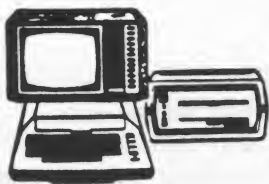
## COMING ATTRACTIONS

- A preview/review of Atari Lab.
- Action! RUNTIME library is available. Read the review next month.
- Where to find parts for your 800.
- How to load KoalaPad pictures from BASIC.

PLUSZERO	STOP THE ZERO WITH YOUR PLUS	STARWARP	LAPS A STAR TREK SIMULATION	GENERATOR
HORSE	RUNS A HORSE ACROSS YOUR TV SCREEN	POEM	A POEM CREATOR	DISK #12
HANGMAN	WHAT DO YOU THINK IT IS?	OCTADRAW	DRAW WITH LOTS OF PENS	TVTEST
GALLERY	SHOOTING GALLERY	NOTEOUT	NOTES AND POINTS	SUPRCOMP
ERRTRAP	AN ERROR TRAP ROUTINE	NOTEIN	EXAMPLE	SLIDE
DOGGIES	SWITCH THE DOGS AROUND	MEMDUMP	NOTES AND POINTS EXAMPLE	SIMON
DDHELPER	D&D AID	HORSERAC	DUMPS CONTENTS OF MEMORY	SCREENPR
CHOPSTIX	PLAYS CHOPSTICKS ALL OVER YOUR SCREEN	ELEC	BET ON YOUR FAVORITE HORSE	PUFF
BOOKLIST	DATA BASE PROGRAM FOR BOOKS	DARKSTAR	RUN AN ELECTRIC COMPANY FOR A WHILE	MOBSTERS
BEGINTYP	TYPING PRACTICE	CIPHER	BLOW UP UNSTABLE STAR SYSTEMS	MATCHES
ALIEN	CHEAP MISSILE COMMAND	CALCNT	CREATE AND DECODE CIPHERS	LIGHT
ALCOHOL	DETERMINES THE ALCOHOL CONTENT OF BLOOD	APPLEATR	CALORIE COUNTER WORM EATS AN APPLE	LABELDSK
	DISK 6			ENEMY
ADVENTURE	A DISK BASED ADVENTURE		DISK 9	DOGBITE
	DISK 7	SPY	FIND THE HIDDEN SPIES	DDCREATR
TOWERS	A TOWER OF HANOI GAME	SOUNDSTK	ANOTHER JOYSTICK SOUND TESTER	BATS
STRNG.CRE	CREATES A STRING OUT OF MEMORY	RENUM.LST	RENUMBERS YOUR BASIC PROGRAM	
STATES	STATES AND CAPITALS GAME	PSDLDBP	A SUPER NICE DISK INVENTORY PROGRAM	DISK 13
RUNWAY	LAND YOUR AIRPLANE ON THE RUNWAY	NUMBELI	A NUMBER LINE PRACTICE	XMASTREE
MEMDUMP	DUMPS CONTENTS OF MEMORY	HEXADEC	DEX CONVERTER	ANOTHER CHRISTMAS PROGRAM
MAGIC	AN OLD CARD TRICK	DIALOGUE	AN ICEBREAKER FOR NON COMPUTERISTS	STOPSOUN
DISKTAPE	TRANSFER BASIC PROGRAMS FROM DISK TO TAPE	CONCEN	GAME OF CONCENTRATION	STARWARS.MUS
CIVILWAR	CLASSIC COMPUTER GAME, WAR SIMULATION	CLEWSO	YOU SOLVE THE MYSTERY	STARSHIP
CARDS.COR	A CARD DRAWING ROUTINE	CHICKEN	HOW MANY TIMES DID THE CHICKEN CROSS THE ROAD?	SCEN
BOWL.SS	A GOOD BOWLING GAME	CALENDAR	CREATES CALENDARS FOR YOU	PMPDEMO
APTITUDE	ARE YOU QUALIFIED	BLKJCK	PLAY A GAME OF BLACKJACK	MYRIPEDES.OBJ
AMERICAS	WHAT ARE THE CAPITALS AND COUNTRIES	ASTRONOM	AN ASTRONOMY GAME	LOGO
ALIEN.SS	A MISSILE COMMAND TRAINER			INVENTRY
	DISK 8		DISK #10	A DATA BASE FOR INVENTORY
			-----	HOW MUCH WILL THAT LOAN COST ME?
TIMETRAL	RACE AROUND FOR 5 NUMBERS		DISK #11	FUNCTION
				YOU GUESS THE FUNCTION FROM MATH RESULTS
				DECIDUMP
				DUMPS MEMORY IN DECIMAL, NOT HEX, FORMAT
				BIORYTHM
				ANOTHER BIORYTHM PROGRAM



	DISK 14		CALENDAR		DOGS
WUMPUS	ORIGINAL WUMPUS	WORLD	GUESS AT THE WORLD	MATCHKID.S	HIGH NUMBER MATH
TAXMAN	KEEP AS MUCH AS YOU CAN	DUNGEON.BAT	CAPITALS	FUNCPLT.UTL	NEAT GRAPHICS
STNIC.PIC	ST. NICHOLAS DATA FOR PRINT.BAS		DO BATTLE WITH THE EVIL MAGICIAN IN HIS CASTLE	TREASURE	FIND THE LOST TREASURE
SIMON	YET ANOTHER SIMON GAME	FOOTBALL	A FOOTBALL GAME, WHAT ELSE?	STARDSTR	PENETRATE UNKNOWN STAR SYSTEM
ROCKET	WATCH A ROCKET TAKE OFF	SPEEDREA.D	LEARN HOW TO INCREASE YOUR READING SPEED	PROGRAM.NO	A PRIME NUMBER PROGRAM GENERATOR
PRINT.BAS	PRINTS DATA FILES USING CHARACTERS	ETCHPRNT	DRAW ON YOUR TV SCREEN	FALCON	DRAWS THE STAR WARS SHIP
MONOPOLY	MONOPOLY ANYONE?	USA.PIC	PICTURE OF THE UNITED STATES	SPELLBEE	A SPELLING GAME
LABELDSK	LABELDSK RETURNS (SORRY)	LANDER.PIC	PICTURE OF A LANDER	PRICE	A GUESSING GAME
KEYBOARD.MUS	PLAYS MUSIC FROM THE KEYBOARD		DISK 18	MAGIC	YET ANOTHER MAGIC TRICK
HEXADEC	HEXADEC RETURNS (SORRY)			JAZZ	A SCREEN GRAPHICS DISPLAY
HAMURABI	ECONOMIC GAME	SUPERMAN	MAN OF STEEL GAME	MAGBLK.GAM	ANOTHER (****) GAME
ERTHQWAK	EARTHQUAKE	PRINTCAL	PRINT A CALENDAR		DISK 21
DRAGMAZE	FIND YOUR WAY OUT OF THE DRAGON'S MAZE	MOONSURV.IAL	STRANDED ON THE MOON	XMODEM43.COM	ANOTHER MODEM UTILITY
CHARLIE.PIC	DATA FOR PRINT.BAS - CHARLIE BROWN PICTURE	SNAKE	HIT AS MANY BOXES AS YOU CAN WITH THE SNAKE	SUPRDUP.COM	A SUPERDUP TYPE UTILITY
	DISK 15			ESCAPE	PILOT YOUR SHIP
XMODEM	RECOMMENDED MODEM PROGRAM FOR TAIG BBS	HATNRING	PRESIDENTIAL ELECTION GAME	REVERSE	AVOIDING METEORS
SLOTS2	ANOTHER SLOT MACHINE	GEOQUIZ	GEOGRAPHY QUIZ		SOLVE HOW TO REVERSE
SLOTS	A SLOT MACHINE	PINBALL	ANOTHER PINBALL GAME		RANDOM ORDER OF NUMBERS
RPMTEST	DISK SPEED CHECKER	DETECTIVE	SOLVE THE CRIME	ZONEX	AVOID HITTING HORIZONTAL AND VERTICAL BARS
ROBOT	BERSERK TYPE GAME	MATHTIME	A MATH TEST		
CASTLE	AN ADVENTURE			PACINVA.D.BAS	SHOOT DOWN THE PACMAN TYPE INVADERS
BALLOONS	POP THE BALLOONS			RECKLESS	HOW GOOD A DRIVER ARE YOU?
	DISK 16			METSTRM	AVOID HITTING THE METEORS IN THIS GAME
YAHTZEE	PLAY YAHTZEE	SHADING	CUBE COLOR DEMO	NEWCLOCK.B01	PICK THE TIME AND WATCH IT APPEAR ON HUGE CLOCK
TINYTEXT	A BASIC WORD PROCESSOR	OILGAME.REV	DRILL WELLS, MAKE MONEY	PETALS.BAS	A GUESSING GAME USING THE PETALS ON A ROSE
PONG	MACHINE LANGUAGE PONG GAME	COMBAT	DO BATTLE WITH MONSTERS	SHOWDOWN.BAS	A TWO PLAYER FIGHT EM OUT GAME
FROG	EAT ALL THE FLIES	MODEM3	MODEM/DISK UTILITY	OMAZE.BAS	A DIFFERENT TYPE GAME, IT -----?
FINANCE	A FINANCIAL AID PROGRAM	CARDS	PROGRAM YOUR OWN GAME	DRAW.BAS	CLEAR OR SHOULD I SAY COVER THE SCREEN IF YOU CAN
DUNGEON2	FIGHT YOUR WAY THROUGH	DISKDUMP	DISK/PRINTER UTILITY		APRIL DISK OF THE MONTH PROGRAMS
BANKSHOT	BANK THE POOL BALL IN	FIVESTUD	BEAT ALBERT AT CARDS		
	DISK 17	CHEMQUIZ.BAS	EDUCATIONAL		
CLOCK.DIG	A DIGITAL CLOCK	LEYTE.II	WAR GAME		
		SUPERCUBE.2	TRY IT AND SEE		
			DISK 20		
		SUPSLOTS.B01	ANOTHER SLOT GAME, AGAIN		
		ALIENCAP.TUR	CAPTURE THE ENEMY SHIP		
		PAINTDUE.16K	DUEL WITH BIG BIRD	PASSION	EXCELLENT MUSIC
		MAILMAN	DELIVER THE MAIL, BUT WATCH OUT FOR THOSE	SUPERLTR	NICE GRAPHICS DISPLAY
				TESTPAT	NIFTY PROGRAM



## GREEN LAKE COMPUTER CAMP



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Jan Kieber  
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Please write for brochure or use application in February's TAIG newsletter

GRAPH	CHOOSE A GRAPHICS MODE
REMGAMES	MATHTIME AGAIN
LUNAR	LUNAR LANDING AGAIN
MUNCHERS	CHOMP, CHOMP, CHOMP
BRIDGE	CONTRACTORS AT WORK
ROTATION	AROUND & AROUND

ATR-8000&CP/M  
GROUP MEETING

about player missile graphics and  
display list interrupts.

SEE YOU AT THE MEETING

FORTH MINI-GROUP  
By Bob Floyd

The FORTH mini-group will meet again at 6:00 pm, just before the main group for the April meeting. I will have my 400, disk drive, TV and valFORTH for hands-on learning and demonstration. With the limited time available, I plan to type in (and let you type in) some simple programs with and without the Editor. I hope to see a lot of you there.

For all you CP/M and ATR-8000 owners or anyone interested, there will be a meeting at the interest group time-slot (6p.m.). Questions will be answered (hopefully) and we can discuss what's going on in the CP/M-ATARI world. Hope to see you there.

\* AN ATARI OF MANY COLORS  
By Mark Neuman

One of the questions asked on the T.A.I.G. Random Access Memo was, "How do you get more than five colors on the screen at once?". Since this is an often asked question I will answer it in three parts, each dealing with a different technique. In this first article I will explain how to use "GRAPHICS 9, 10 and 11." Then in coming articles I will tell you

To use any of these graphics modes your computer must have the GTIA chip, which all of the newer ATARI computers have. To see if your computer has the GTIA or the older CTIA type in this program.

10 GR. 9 --- 20 GOTO 20

If your TV screen goes black and stays black (until you stop the program) your computer has the GTIA chip. However, if your TV screen stays blue, then you have the CTIA chip and at this time you will not be able to use these graphics modes. If you have a CTIA you can have any repair shop replace it with a GTIA for a nominal cost (approx. \$40).

These new graphics modes allow for many colors to be on the screen at one time. For example graphics mode 9 gives you one color but in

sixteen shades, which you designate by using the COLOR command. Thus to get shade level zero (or black) you would type "COLOR 0" and plot away, but if you want shade level sixteen (or white) you would type "COLOR 16" and plot away, for other shades use COLOR numbers between 0 and 16.

This is not to indicate that you are limited to black to white, using "SETCOLOR 4,color,0" will change the color in which all the shades will be displayed. Using this mode it is possible to shade shapes and give them a 3-D look. Graphics mode 11 allows you to have up to sixteen colors on the screen at one time. All the colors will have the same shade level which is set by the "SETCOLOR 4,0,shade" command. Then to select a color you use to "COLOR #" command, where the # is the color you want to PLOT or DRAWTO with. By far the most used of these new graphics modes is "GRAPHICS 10" which allows nine color/shade combinations. This gives you the choice of displaying up to 1152 different mixes of colors at the same time. Like the other graphics modes you select which color you want to PLOT by using the "COLOR #" command, but to set the colors you cannot use the "SETCOLOR" command. To set the color/shade you want you must POKE the data directly into the color registers. These registers are at addresses 704 to 712, with 704 being COLOR #1 and incrementing up to 712 being COLOR #9. You should note that the first four locations are the player missile color registers, so you must be careful if you intend to use player missile graphics in graphics mode 9. A formula you can use to calculate what number to POKE to get the color/shade combination you want is NUMBER =COLOR\*16+shade then POKE this NUMBER into the appropriate register and you are all set. In all of these graphics modes the

pixel plotted to the screen is about four times as long as it is deep, and gives you a 79x199 screen (with no text window) so you need to take care in planning your display to account for this awkward pixel. What I do is make-believe that I have a graphics mode five screen. Then when I plot a pixel, I immediately plot the next three below it, making each plotted point look like a square. One of the drawbacks is that I cannot use the DRAWTO command, but such is life. Now for those of you who want to see COLORS here is a short program which will put all 256 colors on the screen at the same time.

```
100 DIM X$(17):FOR Z=1 TO 15
:READ W:X$(Z)=CHR$(W):NEXT Z
200 GRAPHICS 9:FOR K=0 TO 79
:COLOR K/5:PLOT K,0:DRAWTO K,191
:NEXT K:K=USR(ADR(X$))
220 DATA 173,11,212,10,229,20,41
,240,141,26,208,208,243,240,241
```

#### EDITORIAL COMMENTS

I know that I will receive some complaints about flagging articles received after the deadline. I don't want to scare anyone off but I do want people to know what we have to go through to produce the newsletter.

This newsletter should be in the latest and greatest format (unless scheduling problems prohibit it) which is, in case you didn't notice, 11" x 17" format. Please make some comments to the officers or to me at the next meeting.

\*\*\*\*\*  
FOR SALE: AXIOM AT100 dot matrix  
graphics printer, direct connect to  
ATARI. \$230.00 -ATARI 1025 printer,  
\$300 -ATARI 825 printer, \$300  
(612) 861-1893

```
#####
#####
###
### FYI
###
### To submit all those articles###
### that you have on the back-###
### burner.
###
### 1) Drop a disk with your
### article to me at the
### meetings.
### 2) Mail me your disk.
### Ralph Jenson
### 8008 W. 28th
### St. Louis Park, MN 55426
### 3) Upload them to me.
### Call me at 935-4397
### and we can figure out a
### way.
###
#####
#####
```

#### TAIG HALL OF FAME by MDN

Sorry I have not been writing lately, but I think I have finally got my act together. As you might have noticed, the High Score Box was at the last meeting and I recieved 5 scores to enter into the Hall of Fame. If you want to enter a score, just put it in the box. If you want, you can call me at 452-5932 and tell me your score. Notice that this number is different from the last. (My family and I just moved.) Thanks, MDN.

#### TAIG HALL OF FAME

GAME	SCORE	PLAYERS NAME
Encounter	250,000	Steve Vasel
Robotron	224,300	Steve Vasel
Star Trek	305,000	Steve Vasel
Zepplin	42,720	Adam Vasel
Getaway	75,000	James Hogan
Jawbreaker	55,180	MDN
Apple Panic	153,930	Don Nelson
DigDug	114,800	MDN
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TWIN CITIES ATARI INTEREST GROUP  
6824 QUEEN AVENUE SOUTH  
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Next TAIG Meeting  
Sunday April 29, 1984  
Interest Groups - 6:00 p.m.  
TAIG - 7:00 p.m.

St. Louis Park Rec. Center  
5005 West 36th Street  
St. Louis Park